

# Denatured Fuel Ethanol

California Air Resources Board

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## Proposed California Phase 3 Reformulated Gasoline Regulations Workshop

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# ARB Objective

“Provide flexibility where possible,  
without sacrificing emissions  
benefits, to facilitate the expected  
significant use of ethanol in  
California gasoline”



# Sulfur in Ethanol

## Sources of Sulfur

- Denaturant
- Ethanol Production Process



# Why Denature Ethanol

*Bureau of Alcohol Tobacco & Firearms (BATF)- A denaturant is...*

*“A material authorized by this part (27 CFR Ch.1) to be added to spirits in order to make those sprits unfit for beverage or internal human medical use”*



# Who Cares About Denaturants

- Ethanol Producers
- Refiners & Marketers - CUSTOMER
- California Air Resources Board
- Bureau of Alcohol, Tobacco & Firearms
- ASTM
- EPA
- Internal Revenue Service



# What Denaturants Are Used

- ASTM prohibits hydrocarbons with an end boiling range higher than 225° C.
- Natural Gasoline
- Conventional Unleaded Gasoline
- Raffinate



# How Much Denaturant

- BATF CDA 20
- BATF Requires as little as 2 gallons of denaturant to every 100 gallons of fuel ethanol
- ASTM allows as much as 5 gallons of denaturant to every 100 gallons of fuel ethanol
- Ethanol producers add close to 4.76 % volume



# Sulfur Reduction Options

- Denature with a lower sulfur hydrocarbon
- Reduce denaturant level from 5 parts to 2 parts per 100 parts
- Meet respective BATF bonding requirements to receive 200 proof undenatured ethanol
- Sulfur reduction options at the ethanol production plant
- Negotiate with your ethanol supplier





# Ethanol in CaRFG 3

- ARB proposed sulfur, benzene, olefin and aromatic limits on denatured ethanol are only a placeholder for discussion
- The ethanol industry needs time to review sulfur reduction options
- Many producers still analyzing sulfur content in ethanol & denaturant



# In General

*The ethanol industry will find creative solutions*

- 1). To meet a reasonable CaRFG3 sulfur standard
- 2). Provide maximum volume of denatured ethanol for California market demand

